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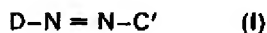
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None

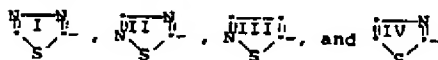
(58) Field of search
C4P

(54) **Disperse and acid azo dyes having 1,2-dihydroquinoline couplers and heterocyclic diazos**

(57) New dyes of formula (I) give blue to green shades on polyamide fibres:



wherein C' is an optionally substituted 1,2-dihydroquinoline coupler, and D is selected from:



wherein rings I-IV are optionally substituted.

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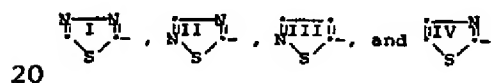
SPECIFICATION

Disperse and acid azo dyes having 1,2-dihydroquinoline couplers and heterocyclic diazos

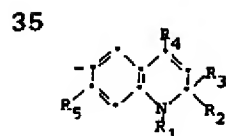
- 5 This invention concerns disperse and acid dyes particularly suited for the dyeing of polyamide fibres, and having the general formula



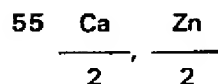
- 10 wherein D is thiazol-2-yl, isothiazol-3-yl, 1,2,4-thiadiazol-5-yl or 1,3,4-thiadiazol-2-yl, each of which is unsubstituted or substituted with substituents such as acyl, acylamido, alkyl, SO₃M, carboalkoxy, halogen, cyano and alkyl-SO₃M, as defined below, and C' is a 1,2-dihydroquinoline coupler which is unsubstituted or substituted with such substituents as alkyl, aryl, alkyl-SO₃M, and substituted alkyl.
- 15 More particularly, with regard to the above formula, D is selected from



- wherein the rings I-IV are either unsubstituted or substituted with substituents selected from alkyl, alkoxy, halogen, alkylsulfonyl, SO₂NH₂, SO₂NHalkyl, SO₃M, alkyl-SO₃M, SO₂N(alkyl)₂, arylsulfonyl, acylamido, aryl, arylthio, alkenylthio, cyclohexylthio, SO₃C₆H₅, cyano, thiocyno, cyclohexylsulfonyl, alkylthio, nitro, formyl, alkanoyl, alkoxy-carbonyl, aroyl, dialkylcarbamoyl, aroylamino alkylsulfonamido, CF₃, carbamoyl, alkylcarbamoyl, and cyclohexyl, wherein the alkyl, alkenyl and cyclic moieties in said ring substituents may bear up to three substituents different from the moiety and independently selected from hydroxy, alkyl, alkoxy, aryl, cyclohexyl, furyl (C₄H₃O), aroyloxy, alkoxy-carbonyl, alkanoyloxy, SO₂NH₂, SO₂NHaryl, SO₂NHalkyl, SO₂N(alkyl)₂, NHCOOalkyl, NHCONHalkyl, acylamido, alkylsulfonamido, succinimido (C₄H₄O₂N), alkyl-SO₃M, glutarimido (C₅H₆O₂N), phthalimido (C₈H₄O₂N), 1-(2-pyrrolidono) (C₄H₆ON), cyano, CONH₂, CONHalkyl, CON(alkyl)₂, alkoxy-alkoxy, alkylthio, halogen, arylthio, alkylsulfonyl, arylsulfonyl, and aryloxy, and the coupler C' has the formula

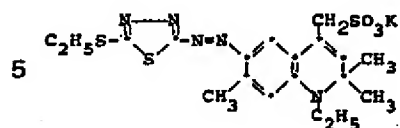


- wherein R₁ is H or a group selected from alkyl, aryl and cyclohexyl, which groups may themselves be substituted with 1-3 substituents different from the said group and independently selected from hydroxy, alkoxy, aryl, aryloxy, cyclohexyl, cyclohexoxy, furyl (C₄H₃O), aroyloxy, alkoxy-carbonyl, alkanoyloxy, SO₂NH₂, SO₂NHaryl, SO₂NHalkyl, SO₂N(alkyl)₂, NHCOOalkyl, NHCONHalkyl, acylamido, alkylsulfonamido, succinimido (C₄H₄O₂N), glutarimido (C₅H₆O₂N), phthalimido (C₈H₄O₂N), 1-(2-pyrrolidono) (C₄H₆ON), cyano, CONH₂, CONHalkyl, -SO₃M, alkyl-SO₃M, CON(alkyl)₂, alkoxyalkoxy, alkylthio, halogen, arylthio, alkylsulfonyl and arylsulfonyl, R₂ and R₃ are each independently selected from H and alkyl, R₄ is H, alkyl or alkyl-SO₃M, and R₅ is selected from H, alkyl, alkoxy, alkenyl of 2-6 carbons, halogen, acylamido, alkylthio and formamido, wherein the alkyl moieties thereof may be substituted with 1-3 substituents independently selected from hydroxy, halogen, cyano, alkoxy, alkylthio, alkanoyl, alkanoyloxy, and alkoxy-carbonyl, wherein M is selected from H, Na, K, NH₄,



- and the colorless cations of primary, secondary and tertiary aliphatic and aryl amines.
- 60 The various alkyl moieties in, for example, alkoxy, alkanoyl and the like within the above definitions of R₁, R₅, and the D radical substituents preferably have 1-6 carbons, and they and the alkenyl groups are straight or branched chain. Any aryl moiety preferably has 6-10 ring carbon atoms.

- Preferred of the present dyes are where the substituents on the D rings are selected from alkylthio, arylthio, cyclohexylthio, alkyl-SO₃M, cyanoalkyl, alkyl and halogen, R₁ is H, alkyl,



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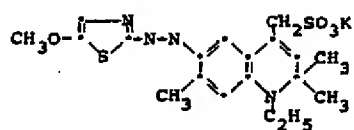
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EXAMPLE 3

By application of the above procedure, in Example 2, the following dye is prepared

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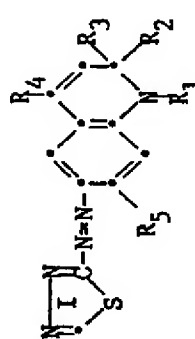
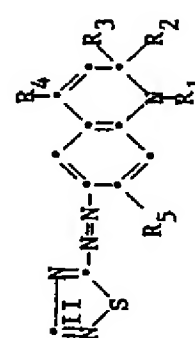
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The exemplary dyes of the following tables are prepared as in the above examples by procedural modifications if such are needed, as known to those skilled in the art.

TABLE 1

Substituent on Ring I or II			and 		$\frac{R_1}{R_2}$
	$\frac{R_5}{R_4}$	$\frac{R_2}{R_3}$	$\frac{R_3}{R_4}$	$\frac{R_4}{R_5}$	
None	H	H	H	H	H
None	H	H	CH ₃	CH ₃	C ₂ H ₅
CN	CH ₃	CH ₃	CH ₃	CH ₃	C ₃ H _{7-n}
CH ₃	CH ₂ CH ₂ OH	CH ₃	CH ₃	CH ₂ SO ₃ K	C ₄ H _{9-n}
CH ₂ CH ₂ SCH ₃	CH ₂ Cl	H	CH(CH ₃) ₂	CH ₃	CH ₂ CH ₂ -SO ₂ NHC ₆ H ₅
CH ₂ CH ₂ OCH ₂ CH ₂ OC ₂ H ₅	OCH ₂ Cl	H	CH ₃	CH ₂ SO ₃ Na	CH ₂ CH ₂ OC ₆ H ₅
CH ₂ CH(CH ₃) ₂	OCH ₃	H	N	H	CH ₃
C ₆ H ₄ -p-SO ₃ K	OCH ₃	H	H	CH ₂ SO ₃ (Ca/2)	C ₆ H ₄ -p-SO ₃ K
C ₆ H ₁₁	CH ₂ CH ₂ CN	H	H	CH ₂ SO ₃ (Zn/2)	C ₆ H ₁₁
C ₆ H ₄ -o-Cl	Cl	H	CH ₃	CH ₃	CH ₂ CH ₂ OC ₆ H ₁₁
C ₆ H ₄ -m-CH ₃	Cl	H	CH ₃	CH ₂ SO ₃ NH ₄	CH ₂ CH ₂ SO ₂ NH ₂
C ₆ H ₄ -p-OCH ₃	H	H	CH ₃	CH ₃	CH ₂ CH ₂ OH

OC_2H_5	OCH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{CHSO}_2\text{N}(\text{C}_2\text{H}_5)_2$
$\text{CH}_2\text{SO}_2\text{NHCH}_3$	NHCHO	CH_3	CH_3	CH_3	$\text{CH}_2\text{CHOC}_2\text{H}_5$
$\text{CH}_2\text{SO}_2\text{NH}_2$	$\text{NHCOC}_2\text{OCCH}_3$	C_4H_9	C_4H_9	C_4H_9	CH_2CN
$\text{CH}_2\text{OOCCH}_3$	$\text{NHCOC}_2\text{CH}_3$	C_4H_9	C_4H_9	H	CH_2CONH_2
$\text{CH}_2\text{COOCH}_3$	NHCOC_2H_5	C_4H_9	C_4H_9	H	$\text{CH}_2\text{CONHCH}_3$
$\text{CH}_2\text{OOC}_6\text{H}_5$	NHCOC_6H_5	C_3H_7	C_3H_7	$\text{CH}_2\text{SO}_3\text{K}$	$\text{CH}_2\text{CON}(\text{C}_2\text{H}_5)_2$
SO_2NHCH_3	NHCOC_2H_5	C_3H_7	C_3H_7	H	$\text{CH}_2\text{NHCOC}_2\text{H}_5$
$\text{CH}_2\text{CON}(\text{C}_2\text{H}_5)_2$	$\text{NHCOC}_6\text{H}_{11}$	C_3H_7	C_3H_7	$\text{CH}_2\text{SO}_3\text{N}(\text{Et})_3$	$\text{CH}_2\text{NHCOC}_2\text{H}_5$
Cl	H	CH_3	CH_3	H	$\text{CH}_2\text{OOCCH}_2\text{SO}_3\text{K}$
$\text{CH}_2\text{CH}_2(\text{C}_4\text{H}_9\text{O})$	CH_2SCH_3	H	CH_3	$\text{CH}_2\text{SO}_3\text{N}(\text{HCH}_3(\text{Ph}))_2$	$\text{CH}(\text{C}_4\text{H}_9\text{O})$
$\text{SO}_2\text{C}_6\text{H}_{11}$	$\text{CH}_2\text{CH}=\text{CH}_2$	H	H	H	$\text{CH}_2\text{CH}_2\text{COOCH}_3$
I	Br	H	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{COOCH}_3$
Br	I	H	CH_3	CH_3	H
SO_2CH_3	F	H	CH_3	$\text{CH}_2\text{SO}_3\text{K}$	$\text{CH}_2\text{CH}_2\text{C}_2\text{H}_5$
SO_2NH_2	SCH_3	H	CH_3	CH_3	C_3H_7
$\text{SO}_2\text{NHCH}_2\text{SO}_3\text{K}$	$\text{CH}_2\text{OOCCH}_3$	H	CH_3	CH_3	C_2H_5

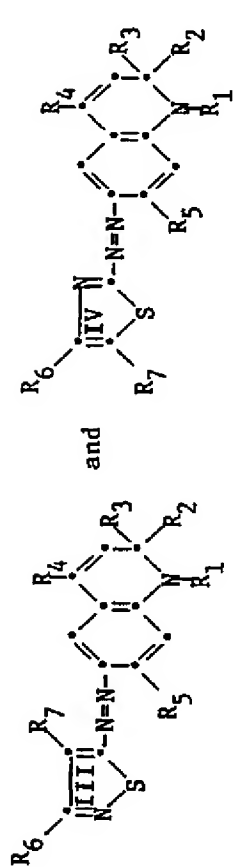
$\text{SO}_2\text{N}(\text{C}_2\text{H}_5)_2$	OCH_3	H	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{C}_6\text{H}_5$
$\text{SO}_2\text{NHCH}_2\text{CH}_2\text{CH}_2\text{OCH}_3$	CH_3	H	CH_3	CH_3	$\text{CH}_2\text{C}_6\text{H}_{11}$
$\text{SO}_2\text{CH}_2\text{CH}_2\text{OC}_2\text{H}_5$	CH_3	H	CH_3	CH_3	CH_2Cl
SC_6H_5	$\text{CH}_2\text{CH}_2\text{COOCH}_3$	H	CH_3	CH_3	C_6H_5
SC_6H_{11}	$\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$	H	CH_3	CH_3	$\text{C}_6\text{H}_4\text{-P-OCH}_3$
$\text{SO}_2\text{C}_6\text{H}_5$	CF_3	H	CH_3	CH_3	$\text{C}_6\text{H}_{10}\text{P-OH}$
$\text{SO}_3\text{C}_6\text{H}_5$	CF_3	H	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{SC}_6\text{H}_5$
$\text{SCH}_2\text{CH}_2\text{OH}$	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{SO}_2\text{CH}_3$
$\text{SCH}_2\text{CH=CH}_2$	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{SO}_2\text{C}_6\text{H}_5$
$\text{SCH}_2\text{COOC}_2\text{H}_4\text{-SO}_3\text{K}$	$\text{CH}_2\text{CH}(\text{Cl})\text{CH}_2\text{Cl}$	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OC}_2\text{H}_5$
$\text{SCH}_2\text{C}_6\text{H}_5$	$\text{CH}_2\text{CH}(\text{OCH}_3)\text{CH}_2\text{OCH}_3$	CH_3	CH_3	CH_3	CH_2CN
$\text{SCH}_2\text{C}_6\text{H}_{11}$	CH_3	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{K}$	$\text{CH}_2(\text{C}_8\text{H}_4\text{O}_2\text{N})$
$\text{SCH}_2\text{CH}_2\text{OC}_2\text{H}_5$	CH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{CONHCH}_3$
SCN	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CON}(\text{C}_2\text{H}_5)_2$
$\text{SCH}_2\text{CH}_2\text{NHCOCH}_3$	H	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{Na}$	$\text{CH}_2\text{NHCOCH}_3$
$\text{SCH}_2\text{CH}_2(\text{C}_4\text{H}_4\text{O}_2\text{N})$	CH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{NHCOOCH}_3$
$\text{CH}_2\text{SC}_6\text{H}_5$	$\text{CH}_2\text{CH}_2\text{OH}$	CH_3	CH_3	CH_3	$\text{CH}_2\text{OOCCH}_3$

$\text{CH}_2\text{CH}_2\text{SO}_2\text{CH}_3$	CH_2Cl	CH_3	CH_3	CH_3	$\text{CH}_2(\text{C}_4\text{H}_4\text{O}_2\text{N})$
$\text{CH}_2\text{SO}_2\text{C}_6\text{H}_5$	OCH_2Cl	CH_3	CH_3	H	$\text{CH}_2\text{CH}_2\text{COOCH}_3$
$\text{SCH}_2\text{CH}_2\text{OC}_6\text{H}_5$	OCH_3	CH_3	CH_3	H	$\text{CH}_2\text{CH}_2\text{COOCH}_3$
SCH_2CH_3	OCH_3	CH_3	CH_3	$\text{C}_3\text{H}_7\text{-n}$	$\text{CH}_2\text{OCC}_6\text{H}_5$
$\text{CH}_2(\text{C}_8\text{H}_4\text{O}_2\text{N})$	$\text{CH}_2\text{CH}_2\text{CN}$	CH_3	CH_3	$\text{C}_3\text{H}_7\text{-n}$	C_2H_5
$\text{CH}_2\text{NHCONHCH}_3$	Cl	CH_3	CH_3	C_2H_5	C_2H_5
$\text{CH}_2\text{NHCOOCH}_3$	H	CH_3	CH_3	C_2H_5	C_2H_5
$\text{CH}_2\text{SO}_2\text{NHC}_6\text{H}_5$	OCH_3	CH_3	CH_3	C_2H_5	C_2H_5
$\text{CH}_2\text{SO}_2\text{N}(\text{C}_2\text{H}_5)_2$	NHCHO	H	H	CH_3	CH_3
SCH_3	$\text{NHCOCH}_2\text{OCH}_3$	H	H	H	C_6H_5
$\text{CH}_2(\text{C}_4\text{H}_4\text{O}_2\text{N})$	$\text{NHCOCH}_2\text{CH}_2\text{OCH}_3$	CH_3	CH_3	CH_3	C_6H_{11}
$\text{CH}_2\text{SO}_2\text{NHCH}_3$	NHCOC_2H_5	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{K}$	C_2H_5
$\text{CH}_2\text{CH}_2\text{NHCOCH}_3$	NHCOC_6H_5	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
NHCOCH_3	NHCOC_2H_5	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
$\text{CH}_2\text{CH}_2(\text{C}_4\text{H}_6\text{ON})$	$\text{NHCOC}_6\text{H}_{11}$	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{NH}_4$	$\text{CH}_2\text{CH}_2\text{OH}$
$\text{C}_6\text{H}_4\text{-p-CN}$	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OC}_2\text{H}_5$
CH_2CONH_2	CH_2SCH_3	CH_3	CH_3	CH_3	CH_2CN

$\text{CH}_2\text{CONHCH}_3$	$\text{CH}_2\text{CH}=\text{CH}_2$	CH_3	CH_3	CH_3	CH_3	CH_2CONH_2
NO_2	H	H	H	H	H	H
CHO	H	H	CH_3	CH_3	CH_3	C_2H_5
COCH_3	CH_3	CH_3	CH_3	CH_3	CH_3	C_2H_5
COOCH_3	$\text{CH}_2\text{CH}_2\text{OH}$	CH_3	CH_3	CH_3	CH_3	C_2H_5
COC_6H_5	CH_2Cl	H	$\text{CH}(\text{CH}_3)_2$	CH_3	CH_3	C_2H_5
NHCOC_6H_5	OCH_2Cl	H	CH_3	$\text{CH}_2\text{SO}_3\text{NH}_4$	CH_3	C_2H_5
$\text{NH}_2\text{SO}_2\text{CH}_3$	OCH_3	H	N	H	CH_3	C_2H_5
CF_3	OCH_3	H	H	$\text{CH}_2\text{CH}_2\text{SO}_3\text{K}$	CH_3	CH_3
CONH_2	$\text{CH}_2\text{CH}_2\text{CN}$	H	H	H	CH_3	C_6H_{11}
CONHCH_3	Cl	H	CH_3	$\text{CH}_2\text{SO}_3\text{K}$	CH_3	C_2H_5
$\text{CON}(\text{C}_2\text{H}_5)_2$	Cl	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
SCH_2CH_3	H	H	H	H	H	C_2H_5
C_6H_5	CH_3	CH_3	CH_3	CH_3	CH_3	C_2H_5
Cl	CH_3	CH_3	CH_3	H	H	C_2H_5
CH_3	CH_3	CH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{C}_6\text{H}_5$
C_6H_5	CH_3	CH_3	CH_3	H	H	C_2H_5
	CH_3	CH_3	H	H	H	$\text{CH}_2\text{CH}_2\text{OH}$

SCH_2CH_3	CH_3	CH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{C}_6\text{H}_5$
SCH_2CH_3	H	H	H	H	$\text{CH}_2\text{SO}_3\text{NH}_4$	C_2H_5
C_6H_5	CH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{Na}$	C_2H_5
Cl	CH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{Na}$	$\text{CH}_2\text{CH}_2\text{C}_6\text{H}_5$
CH_3	CH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{Na}$	C_2H_5
C_6H_5	CH_3	H	H	H	$\text{CH}_2\text{SO}_3\text{NH}_4$	$\text{CH}_2\text{CH}_2\text{OH}$
SCH_2CH_3	CH_3	H	H	H	$\text{CH}_2\text{SO}_3\text{K}$	$\text{CH}_2\text{C}_6\text{H}_5$

TABLE 2

 and					
R_6	R_7	R_5	R_2	R_3	R_4
\overline{H}	\overline{H}	\overline{H}	\overline{H}	\overline{H}	\overline{H}
H	H	H	H	CH_3	CH_3
Cl	CN	CH_3	CH_3	CH_3	CH_3
Br	CH_3	CH_2CH_2OH	CH_3	CH_3	CH_3
CH_3	$CH_2CH_2SCH_3$	CH_2Cl	H	$CH(CH_3)_2$	CH_2SO_3K
CN	$CH_2CH_2OCH_2CH_2OC_2H_5$	OCH_2Cl	H	CH_3	$CH_2SO_3NH_4$
C_2H_5	$CH_2CH(CH_3)_2$	OCH_3	H	N	$CH_2C_6H_4-p-SCH_3$
$COOCH_3$	C_6H_5	OCH_3	H	H	C_6H_5
$CONH_2$	C_6H_{11}	CH_2CH_2CN	H	H	C_6H_{11}
$CON(C_2H_5)_2$	C_6H_4-O-Cl	Cl	H	CH_3	$CH_2SO_3(Ca/2)$
$CH_2OOC_2H_5$	$C_6H_4-CH_3$	Cl	H	CH_3	$CH_2SO_3(Zn/2)$
C_6H_5	$C_6H_4-p-OCH_3$	H	H	CH_3	CH_2CH_2OH
					CH_2CH_2OH

$\text{CH}_2\text{CH}_2\text{SCH}_3$	OC_2H_5	OCH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
$\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OC}_2\text{H}_5$	$\text{CH}_2\text{SO}_2\text{NHCH}_3$	NHCHO	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OC}_2\text{H}_5$
$\text{CH}_2\text{CH}(\text{CH}_3)_2$	$\text{CH}_2\text{SO}_2\text{NH}_2$	NHCOC_2H_5	$\text{C}_4\text{H}_9\text{-n}$	$\text{C}_4\text{H}_9\text{-n}$	CH_3	CH_2CN
C_6H_5	$\text{CH}_2\text{OOCCH}_3$	NHCOC_2H_5	$\text{C}_4\text{H}_9\text{-n}$	$\text{C}_4\text{H}_9\text{-n}$	H	CH_2CONH_2
C_6H_{11}	$\text{CH}_2\text{COOCH}_3$	NHCOC_2H_5	$\text{C}_4\text{H}_9\text{-n}$	$\text{C}_4\text{H}_9\text{-n}$	H	$\text{CH}_2\text{CONHCH}_3$
$\text{C}_6\text{H}_4\text{-o-Cl}$	$\text{CH}_2\text{OOC}_6\text{H}_5$	NHCOC_6H_5	$\text{C}_3\text{H}_7\text{-n}$	$\text{C}_3\text{H}_7\text{-n}$	$\text{CH}_2\text{CH}_2\text{SO}_3\text{K}$	$\text{CH}_2\text{CON}(\text{C}_2\text{H}_5)_2$
$\text{C}_6\text{H}_4\text{-m-CH}_3$	SO_2NHCH_3	NHCOC_2H_5	$\text{C}_3\text{H}_7\text{-n}$	$\text{C}_3\text{H}_7\text{-n}$	H	$\text{CH}_2\text{NHCOC}_2\text{H}_5$
$\text{C}_6\text{H}_4\text{-p-OCH}_3$	$\text{CH}_2\text{CON}(\text{C}_2\text{H}_5)_2$	$\text{NHCOC}_6\text{H}_{11}$	$\text{C}_3\text{H}_7\text{-n}$	$\text{C}_3\text{H}_7\text{-n}$	$\text{CH}_2\text{SO}_3\text{Na}$	$\text{CH}_2\text{NHCOC}_2\text{H}_5$
OC_2H_5	Cl	H	CH_3	CH_3	H	$\text{CH}_2\text{OOCCH}_3$
$\text{CH}_2\text{SO}_2\text{NHCH}_3$	$\text{CH}_2\text{CH}_2(\text{C}_4\text{H}_9\text{O})$	CH_2SCH_3	H	CH_3	$\text{CH}_2\text{SO}_3\text{N H(Et)}_3$	$\text{CH}(\text{C}_4\text{H}_9\text{O})$
$\text{CH}_2\text{SO}_2\text{NH}_2$	$\text{SO}_2\text{C}_6\text{H}_{11}$	$\text{CH}_2\text{CH=CH}_2$	H	H	H	$\text{CH}_2\text{CH}_2\text{COOCH}_3$
$\text{CH}_2\text{OOCCH}_3$	I	Br	H	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{COOCH}_3$
$\text{CH}_2\text{COOCH}_2\text{SO}_3\text{K}$	Br	I	H	CH_3	CH_3	H
$\text{CH}_2\text{OOC}_6\text{H}_5$	SO_2CH_3	F	H	CH_3	$\text{CH}_2\text{SO}_3\text{K}$	C_2H_5
SO_2NHCH_3	SO_2NH_2	SCH_3	H	CH_3	CH_3	C_2H_5
$\text{CH}_2\text{CON}(\text{C}_2\text{H}_5)_2$	$\text{SO}_2\text{NHCH}_2\text{SO}_3\text{K}$	$\text{CH}_2\text{OOCCH}_3$	H	CH_3	CH_3	C_2H_5
Cl	$\text{SO}_2\text{N}(\text{C}_2\text{H}_5)_2$	OCH_3	H	CH_3	$\text{CH}_2\text{SO}_3\text{NH}_4$	C_2H_5

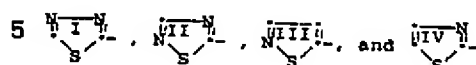
$\text{CH}_2\text{CH}_2(\text{C}_4\text{H}_3\text{O})$	$\text{SO}_2\text{NHCH}_2\text{CH}_2\text{CH}_2\text{OCH}_3$	CH_3	H	CH_3	CH_3	C_2H_5
$\text{CH}_2(\text{C}_8\text{H}_4\text{O}_2\text{N})$	$\text{SO}_2\text{CH}_2\text{CH}_2\text{OC}_2\text{H}_5$	CH_3	H	CH_3	CH_3	CH_3
$\text{CH}_2\text{NHCONHCH}_3$	SC_6H_5	$\text{CH}_2\text{CH}_2\text{COOCH}_3$	H	CH_3	CH_3	C_6H_5
$\text{CH}_2\text{NHCOOCH}_3$	SC_6H_{11}	$\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$	H	CH_3	CH_3	C_6H_{11}
$\text{CH}_2\text{SO}_2\text{NHC}_6\text{H}_5$	$\text{SO}_2\text{C}_6\text{H}_5$	CF_3	H	CH_3	$\text{CH}_2\text{SO}_3\text{Na}$	C_2H_5
$\text{CH}_2\text{SO}_2\text{N}(\text{C}_2\text{H}_5)_2$	$\text{SO}_3\text{C}_6\text{H}_5$	CF_3	H	CH_3	CH_3	$\text{C}_4\text{H}_2\text{CH}_2\text{OH}$
SCH_3	$\text{SCH}_2\text{CH}_2\text{OH}$	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
$\text{CH}_2(\text{C}_4\text{H}_4\text{O}_2\text{N})$	$\text{SCH}_2\text{CH}=\text{CH}_2$	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
$\text{CH}_2\text{SO}_2\text{NHCH}_3$	$\text{SCH}_2\text{COOC}_2\text{H}_5$	$\text{CH}_2\text{CH}(\text{Cl})\text{CH}_2\text{Cl}$	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
$\text{CH}_2\text{CH}_2\text{NHCOCH}_3$	$\text{SCH}_2\text{C}_6\text{H}_5$	$\text{CH}_2\text{CH}(\text{OCH}_3)\text{CH}_2\text{OCH}_3$	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OC}_2\text{H}_5$
NHCOCH_3	$\text{SCH}_2\text{C}_6\text{H}_{11}$	CH_3	CH_3	CH_3	CH_3	CH_2CN
$\text{CH}_2\text{CH}_2(\text{C}_4\text{H}_6\text{ON})$	$\text{SCH}_2\text{CH}_2\text{OC}_2\text{H}_5$	CH_3	CH_3	CH_3	CH_3	CH_2CONH_2
$\text{C}_6\text{H}_4-\text{P}-\text{CN}$	SCN	H	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{K}$	$\text{CH}_2\text{CONHCH}_3$
CH_2CONH_2	$\text{SCH}_2\text{CH}_2\text{NHCOCH}_3$	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CON}(\text{C}_2\text{H}_5)_2$
$\text{CH}_2\text{CONHCH}_3$	$\text{SCH}_2\text{CH}_2(\text{C}_4\text{H}_4\text{O}_2\text{N})$	CH_3	CH_3	CH_3	CH_3	$\text{CH}_2\text{NHCOCH}_3$
H	$\text{CH}_2\text{SC}_6\text{H}_5$	$\text{CH}_2\text{CH}_2\text{OH}$	CH_3	CH_3	CH_3	$\text{CH}_2\text{NHCOOCH}_3$
H	$\text{CH}_2\text{CH}_2\text{SO}_2\text{CH}_3$	CH_2Cl	CH_3	CH_3	CH_3	$\text{CH}_2\text{OOCCH}_3$

Cl	$\text{CH}_2\text{SO}_2\text{C}_6\text{H}_5$	OCH_2Cl	CH_3	CH_3	H	$\text{CH}_2\text{CH}_2\text{COOCH}_3$
Br	$\text{SCH}_2\text{CH}_2\text{OC}_6\text{H}_5$	OCH_3	CH_3	CH_3	H	$\text{CH}_2\text{CH}_2\text{COOCH}_3$
CH_3	SCH_2CH_3	OCH_3	CH_3	CH_3	$\text{C}_3\text{H}_7\text{-n}$	H
CN	$\text{CH}_2(\text{C}_8\text{H}_4\text{O}_2\text{N})$	$\text{CH}_2\text{CH}_2\text{CN}$	CH_3	CH_3	$\text{C}_3\text{H}_7\text{-n}$	C_2H_5
C_2H_5	$\text{CH}_2\text{NHCONHCH}_3$	Cl	CH_3	CH_3	C_2H_5	C_2H_5
COOCH_3	$\text{CH}_2\text{NHCOOCH}_3$	H	CH_3	CH_3	C_2H_5	C_2H_5
CONH_2	$\text{CH}_2\text{SO}_2\text{NHC}_6\text{H}_5$	OCH_3	CH_3	CH_3	CH_3	$\text{C}_6\text{H}_4\text{-o, p-di-Cl}$
$\text{CON}(\text{C}_2\text{H}_5)_2$	$\text{CH}_2\text{SO}_2\text{N}(\text{C}_2\text{H}_5)_2$	NHCHO	H	H	H	CH_3
$\text{CH}_2\text{OOC}_2\text{H}_5$	SCH_3	$\text{NHCOCH}_2\text{OCH}_3$	H	H	H	C_6H_5
C_6H_5	$\text{CH}_2(\text{C}_4\text{H}_4\text{O}_2\text{N})$	$\text{NHCOCH}_2\text{CH}_2\text{OCH}_3$	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{K}$	$\text{C}_6\text{H}_{10}\text{-p-Cl}$
$\text{CH}_2\text{CH}_2\text{SCH}_3$	$\text{CH}_2\text{SO}_2\text{NHCH}_3$	NHCO_2H_5	CH_3	CH_3	CH_3	C_2H_5
$\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OC}_2\text{H}_5$	$\text{CH}_2\text{CH}_2\text{NHCOCH}_3$	NHCO_2H_5	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
$\text{CH}_2\text{CH}(\text{CH}_3)_2$	NHCOCH_3	NHCO_2H_5	CH_3	CH_3	$\text{CH}_2\text{SO}_3\text{K}$	$\text{CH}_2\text{CH}_2\text{OH}$
C_6H_5	$\text{CH}_2\text{CH}_2(\text{C}_4\text{H}_6\text{ON})$	$\text{NHCO}_2\text{H}_{11}$	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OH}$
C_6H_{11}	$\text{C}_6\text{H}_4\text{-p-CN}$	H	CH_3	CH_3	CH_3	$\text{CH}_2\text{CH}_2\text{OC}_2\text{H}_5$
$\text{C}_6\text{H}_4\text{-o-Cl}$	CH_2CONH_2	CH_2SCH_3	CH_3	CH_3	CH_3	CH_2CN
$\text{C}_6\text{H}_4\text{-m-CH}_3$	$\text{CH}_2\text{CONHCH}_3$	$\text{CH}_2\text{CH=CH}_2$	CH_3	CH_3	CH_3	CH_2CONH_2

$C_6H_4-p-OCH_3$	NO_2	H	H	H	H
OC_2H_5	CHO	H	CH_3	CH_3	C_2H_5
$CH_2SO_2NHCH_3$	$COCH_3$	CH_3	CH_3	CH_3	C_3H_7-n
$CH_2SO_2NH_2$	$COOCH_3$	CH_3	CH_3	CH_3	C_4H_9-n
CH_2OOCCH_3	COC_6H_5	H	$CH(CH_3)_2$	CH_3	C_2H_5
CH_2COOCH_3	$NHCOC_6H_5$	H	CH_3	CH_2SO_3K	C_2H_5
$CH_2OOC C_6H_5$	$NHSO_2CH_3$	H	N	H	CH_3
SO_2NHCH_3	CF_3	H	H	H	C_6H_5
$CH_2CON(C_2H_5)_2$	$CONH_2$	H	H	H	C_6H_{11}
Cl	$CONHCH_3$	H	CH_3	$CH_2SO_3NH_4$	C_2H_5
$CH_2CH_2(C_4H_9O)$	$CON(C_2H_5)_2$	H	CH_3	CH_3	CH_2CH_2OH

CLAIMS

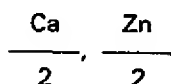
1. A dye of the formula $D - N = N - C^1$ wherein D is selected from



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wherein the rings I-IV are either unsubstituted or substituted with substituents selected from
 10 alkyl, alkoxy, halogen, alkylsulfonyl, SO_2NH_2 , $SO_2NHalkyl$, $SO_2N(alkyl)_2$, arylsulfonyl, acylamido, aryl, arylthio, alkenylthio, cyclohexylthio, SO_3M , alkyl- SO_3M , $SO_3C_6H_5$, cyano, thiocyno, cyclohexyl-sulfonyl, alkylthio, nitro, formyl, alkanoyl, alkoxy-carbonyl, aroyl, dialkylcarbamoyl, aroylamino, alkylsulfonamido, CF_3 , carbamoyl, alkylcarbamoyl, and cyclohexyl, wherein the
 15 alkyl, alkenyl and cyclic moieties in said ring substituents may bear up to three substituents different from the moiety and independently selected from hydroxy, alkyl, alkoxy, aryl, SO_3M , alkyl- SO_3M , cyclohexyl, furyl, (C_4H_9O) , aroyloxy, alkoxy carbonyl, alkanoyloxy, SO_2NH_2 , SO_2N-
 20 $Haryl$, $SO_2NH-alkyl$, $SO_2N(alkyl)_2$, $NHCOOalkyl$, $NHCONHalkyl$, acylamido, alkylsulfonamido, succinimido ($C_4H_4O_2N$), glutarimido ($C_5H_6O_2N$), phthalimido ($C_8H_4O_2N$), 1-(2-pyrrolidono) (C_4H_6ON), cyano, $CONH_2$, $CONHalkyl$, $CON(alkyl)_2$, alkoxyalkoxy, alkylthio, halogen, arylthio, alkylsulfonyl, arylsulfonyl, and aryloxy wherein M is selected from H, Na, K, NH_4 ,

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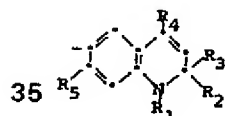
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and the colorless cations of salts of primary, secondary and tertiary aliphatic and aryl amines, and wherein C^1 is a substituted or unsubstituted 1,2-dihydroquinoline radical.

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2. A dye according to Claim 1 wherein the coupler C has the formula

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wherein R_1 is H or a group selected from alkyl, aryl and cyclohexyl, which groups may
 40 themselves be substituted with 1-3 substituents different from the said group and independently selected from hydroxy, alkoxy, aryl, aryloxy, cyclohexyl, cyclohexoxy, furyl (C_4H_3O), aroyloxy, alkoxy-carbonyl, alkanoyloxy, SO_2NH_2 , $SO_2NHaryl$, $SO_2NHalkyl$, $SO_2N(alkyl)_2$, $NHCOOalkyl$, SO_3M , alkyl- SO_3M , $NHCONHalkyl$, acylamido, alkylsulfonamido, succinimido ($C_4H_4O_2N$), glutarimido ($C_5H_6O_2N$), phthalimido ($C_8H_4O_2N$), 1-(2-pyrrolidono) (C_4H_6ON), cyano,
 45 $CONH_2$, $CONHalkyl$, $CON(alkyl)_2$, alkoxyalkoxy, alkylthio, halogen, arylthio, alkylsulfonyl and arylsulfonyl, R_2 and R_3 are each independently selected from H and alkyl, R_4 is H, alkyl or alkyl- SO_3M , and R_5 is selected from H, alkyl, alkoxy, alkenyl of 2-6 carbons, halogen, acylamido, alkylthio and formamido, wherein the alkyl moieties thereof may be substituted with 1-3
 50 substituents independently selected from hydroxy, halogen, cyano, alkoxy, alkylthio, alkanoyl, alkanoyloxy, and alkoxy-carbonyl.

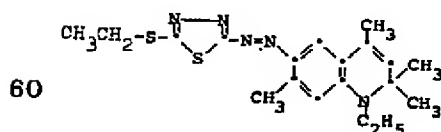
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3. A dye according to Claim 2 wherein the substituents on the D rings are selected from alkylthio, arylthio, cyclohexylthio, alkyl- SO_3M , cyanoalkyl, alkyl and halogen, R_1 is H, alkyl, hydroxyalkyl, alkanoyloxyalkyl or alkoxy-carbonylalkyl, and R_5 is H or alkyl.

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4. The dye according to Claim 1 of the formula

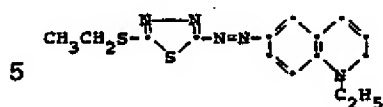
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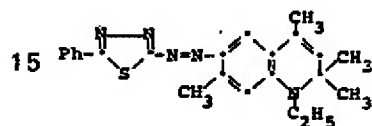
5. The dye according to Claim 1 of the formula

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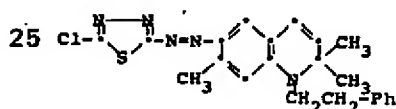
10 6. The dye according to Claim 1 of the formula

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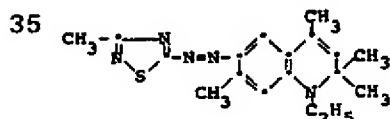
20 7. The dye according to Claim 1 of the formula

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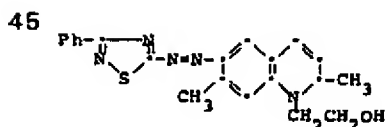
30 8. The dye according to Claim 1 of the formula

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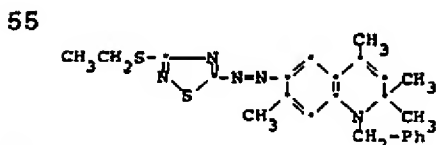
40 9. The dye according to Claim 1 of the formula

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50 10. The dye according to Claim 1 of the formula

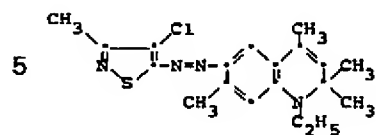
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60 11. The dye according to Claim 1 of the formula

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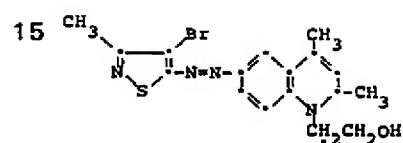


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12. The dye according to Claim 1 of the formula

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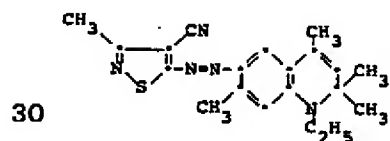
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13. The dye according to Claim 1 of the formula

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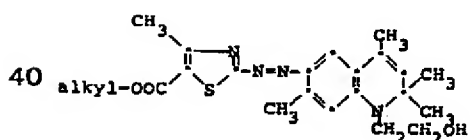


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14. The dye according to Claim 1 of the formula

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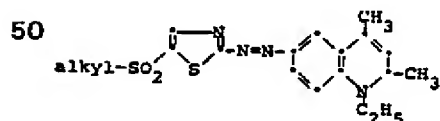


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15. The dye according to Claim 1 of the formula

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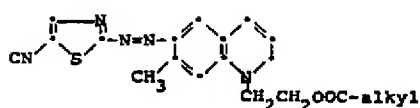
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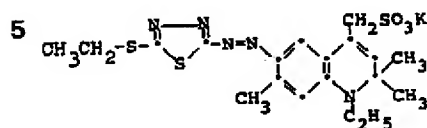
16. The dye according to Claim 1 of the formula

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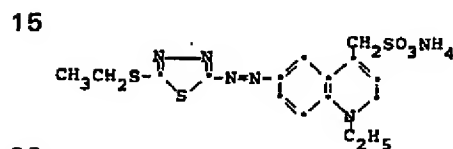
17. The dye according to Claim 1 of the formula



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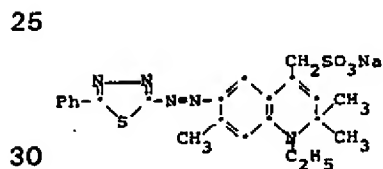
18. The dye according to Claim 1 of the formula



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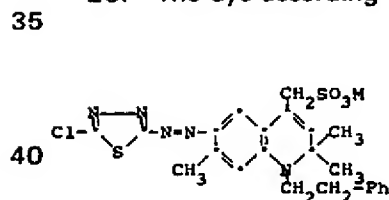
19. The dye according to Claim 1 of the formula



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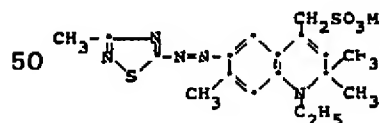
20. The dye according to Claim 1 of the formula



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21. The dye according to Claim 1 of the formula



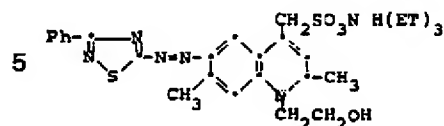
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22. The dye according to Claim 1 of the formula

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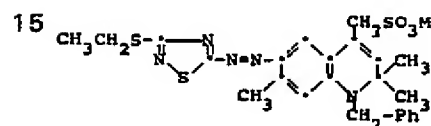
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23. The dye according to Claim 1 of the formula

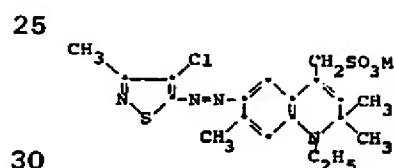
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24. The dye according to Claim 1 of the formula

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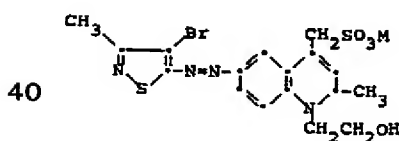
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25. The dye according to Claim 1 of the formula

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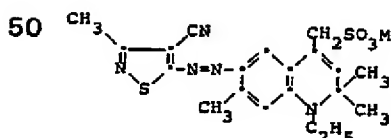


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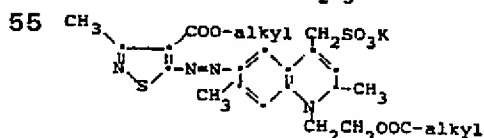
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26. The dye according to Claim 1 of the formula

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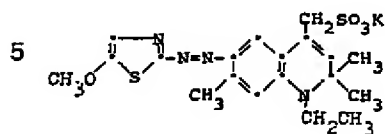


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27. The dye according to Claim 1 of the formula

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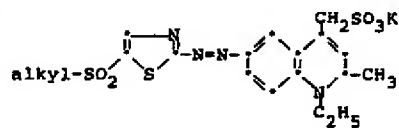
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28. The dye according to Claim 1 of the formula

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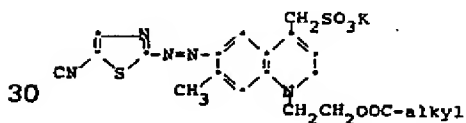
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29. The dye according to Claim 1 of the formula

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